
Water Quality Summary Report No. 33

1998 Follow-up Studies to Ground Water Contamination Detections

Idaho Department of Health and Welfare
Division of Environmental Quality
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ABSTRACT

The ground water studies were generally conducted within a one mile radius of the wells with a ground water contamination detection. If there were not enough wells available within the one mile radius, the study was expanded to include the nearest wells available. All of the sites are near wells that were sampled for the Statewide Ambient Ground Water Monitoring Program with results showing contaminants of concern. Only one Statewide Ambient Ground Water Monitoring Program well, in Mountain Home, was sampled during the 1998 Follow-up Ground Water Studies. It was requested by Idaho Department of Water Resources that the Statewide Ambient Ground Water Monitoring Program wells not be included in the studies, unless absolutely necessary.

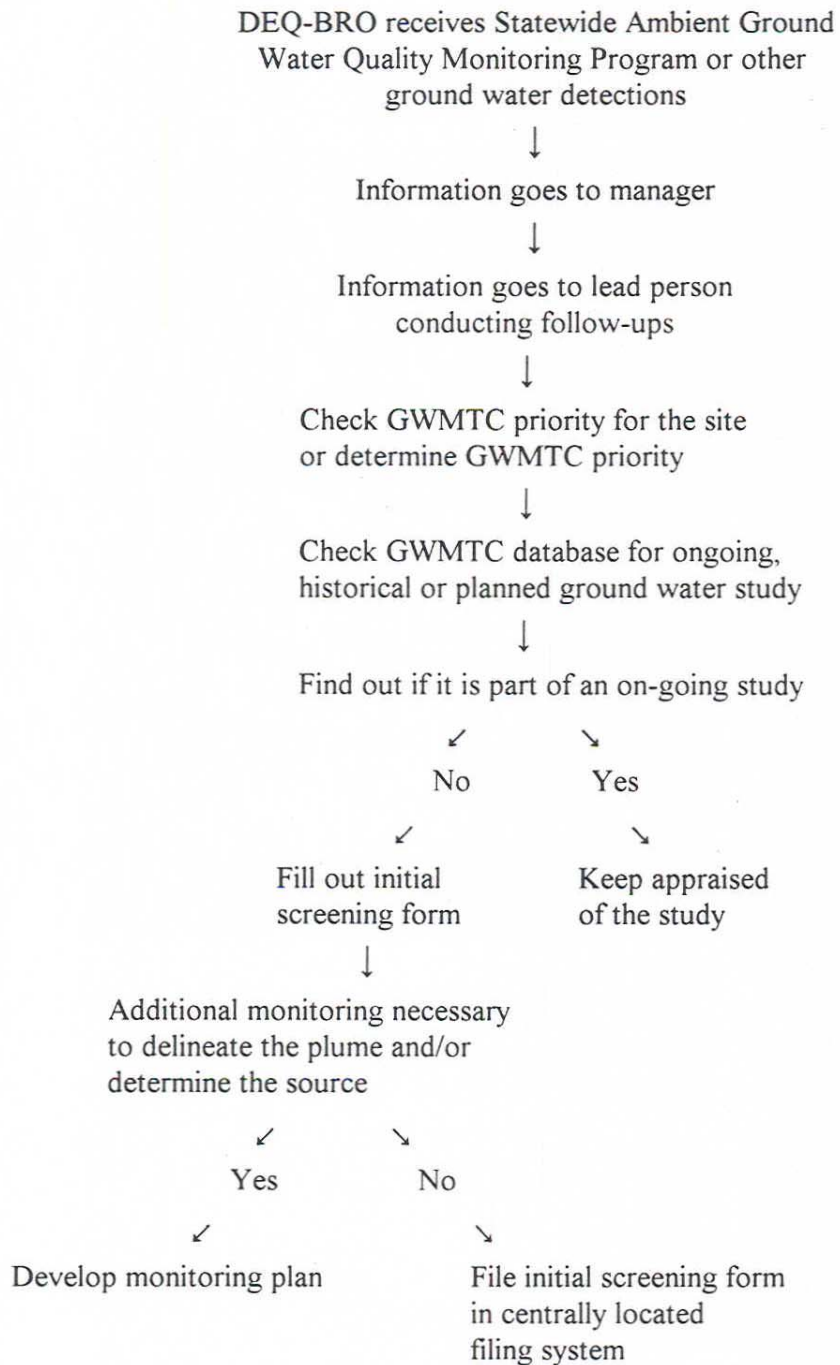
Three of the nitrate study areas were localized problems. The nitrate and arsenic in the West Caldwell area will need additional samples collected in a larger area to identify the cause of the impacts. The arsenic found in the ground water near the Snake River in Canyon and Owyhee Counties was too pervasive to be a localized problem (see Figures 5, 6, 7 and 8 on pages 11, 12, 13, and 14; respectively). The arsenic along the Snake River and the fluoride in the Idaho Batholith appear to be naturally occurring. Additional work is needed to understand the scope of this problem and to help the well owners understand their ground water quality.

INTRODUCTION

The Ground Water Protection Act of 1989 formed the Ground Water Quality Council to develop a Ground Water Quality Plan for Idaho (Ground Water Quality Council, 1992). The Idaho Ground Water Quality Plan of 1992 is a planning document to manage protection of ground water quality, prevention of ground water contamination and remediation of contaminated ground water. It establishes the basis for continuing efforts to protect ground water now, and for future generations.

The policy of the state of Idaho, as stated in the Idaho Ground Water Quality Plan, is to implement and maintain a monitoring program designed to investigate ground water quality in regional and local areas where contamination may have occurred. The Ground Water Monitoring Technical Committee, which is composed of numerous agencies, was formed to identify and prioritize where ground water contamination was found. This report documents the regional follow-up ground water studies in fifteen "Priority One" areas as identified by the Ground Water Monitoring Technical Committee for the Division of Environmental Quality, Boise Regional Office (DEQ-BRO).

Ground Water Detection Follow-up Flow Chart



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METHODS AND MATERIALS

The process of collecting and handling of samples followed the Standard Operating Procedures for the Statewide Ambient Ground Water Quality Monitoring Program (Statewide Program) and Guidelines for the Collection, Treatment, and Analysis of Water Samples, U.S. Geological Survey Western Region Field Manual. All well owners were mailed information regarding the constituent of concern in their area, along with their sampling results and an explanation of their water quality.

RESULTS AND DISCUSSION

Figure 1 on page 4 shows the location of all the ground water study areas. The following text describes the individual ground water studies, first grouped by county and then alphabetically by site name.

ADA COUNTY

Dry Creek

The Dry Creek study area is in Ada County, near Highway 55 and Beacon Light Road, northeast of Eagle. The area is rural with a transition to urban use. Geographically the area is undulating and is located within the alluvial fan of Dry Creek and Goose Creek.

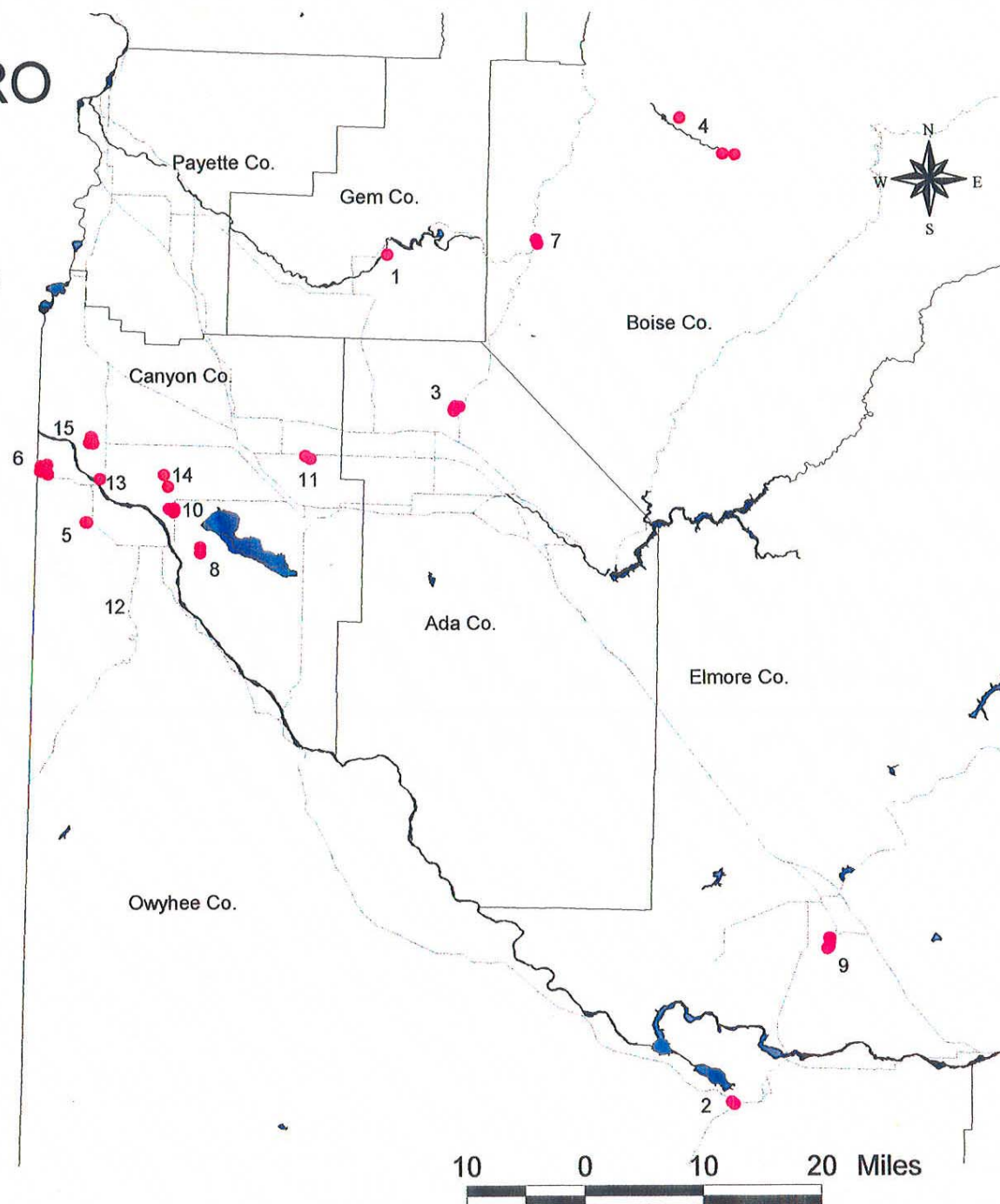
The Statewide Monitoring well in this area had elevated nitrate level of 11 mg/l in 1995. The well was drilled in 1954 to a shallow depth of 54 feet deep with a 20-foot casing. This well is not used for household purposes by the owner. The nitrate problem in this well could originate anywhere from 20 to 54 feet or from the surface since the surface seal for this well is unknown. The integrity of the well may be compromised due to the age of the well (metal corrodes with time) and the location of the well in a low spot from the yard and pastures.

Nitrate is a naturally occurring inorganic ion which makes up part of the nitrogen cycle. Elevated levels of nitrate can result from fertilizers, septic systems and decaying organic material. Nitrate levels greater than 10 milligrams per liter have the potential to cause methemoglobinemia, also known as blue baby syndrome. Methemoglobinemia related to drinking water has been observed in infants up to the age of six months and is suspected of possibly causing miscarriages.

Three permission letters to nearby well owners with well drillers' reports on their wells brought no response from the well owners giving DEQ-BRO permission to sample their wells. At a later

**Figure 1. 1998 DEQ-BRO
Follow-up Studies to
Ground Water
Contaminant Detections**

- Legend**
- 1 Black Canyon
 - 2 Bruneau
 - 3 Dry Creek
 - 4 Garden Valley
 - 5 Homedale
 - 6 Homedale/Adrian
 - 7 Horseshoe Bend
 - 8 Lake Lowell
 - 9 Mountain Home
 - 10 North Marsing
 - 11 North Nampa
 - 12 South Marsing
 - 13 South Wilder
 - 14 West Caldwell
 - 15 West Wilder



date, three more permission letters were sent to nearby well owners with well drillers' reports. By the end of the sampling season, all six well owners asked to be included in the ground water study. Three of the wells results, well # D2, D4 and D6, were non-detect or less than the laboratory detection level for nitrate. The other three wells, well # D1, D3 and D5, had nitrate levels of 2.49 to 4.06 mg/l. The depths of the wells with nitrate detected are 70 feet or less. Nitrate fact sheets were mailed to the well owners with the results.

Similar to some other areas in Idaho, this area is showing elevated nitrate in the very shallow water-bearing zone. The deeper wells have very low nitrate levels, below or just above the laboratory detection level. The Statewide monitoring well is the only well in this area where nitrate level exceeds the Maximum Contaminant Level (MCL) of 10 mg/l. Primary MCLs are based upon health reasons. Previous ground water sampling at a regional level (>10 square miles) has not indicated that nitrate is a regional problem (see Figure 2 page 6).

BOISE COUNTY

Garden Valley

The Garden Valley study area is in Boise County. It is located along the Banks to Lowman Highway and the Payette River, from the city of Garden Valley east about five miles. This is a sparsely populated area on the edge of the Boise National Forest. Except for the yards around the homes native plants are commonly found in this area. The Idaho Batholith, or more specifically the Atlanta Batholith is a visible geologic feature. Numerous geothermal hot springs can be found in this area.

The Statewide Program well in this area had elevated fluoride of 7.5 mg/l. The well is 152 feet deep with a 152-foot casing. The 23-foot surface seal is bentonite. The well was drilled in 1987. The water temperature is 22.2°C, so the possibility of geothermal water influence is very likely. Previous ground water sampling at a regional level (>10 square miles) has indicated that fluoride is a regional problem (see Figure 3 page 7).

Fluoride minerals are commonly found in most volcanic rocks and the soils they form. These minerals are typically not very easily dissolved in water. As a result, natural fluoride concentrations in ground and surface waters are usually low. However, under certain circumstances, natural concentrations can become elevated. Geothermal waters, or cold water bodies that are geothermal-influenced, often contain elevated fluoride concentrations. Fluoride can be helpful or harmful to your body, depending on the fluoride level. Low levels of fluoride in drinking water can be helpful in preventing tooth decay, 0.7 to 1.2 mg/l. Moderate levels, 2 to 4 mg/l, can cause staining and pitting of permanent teeth. Elevated levels, >4 mg/l, in drinking

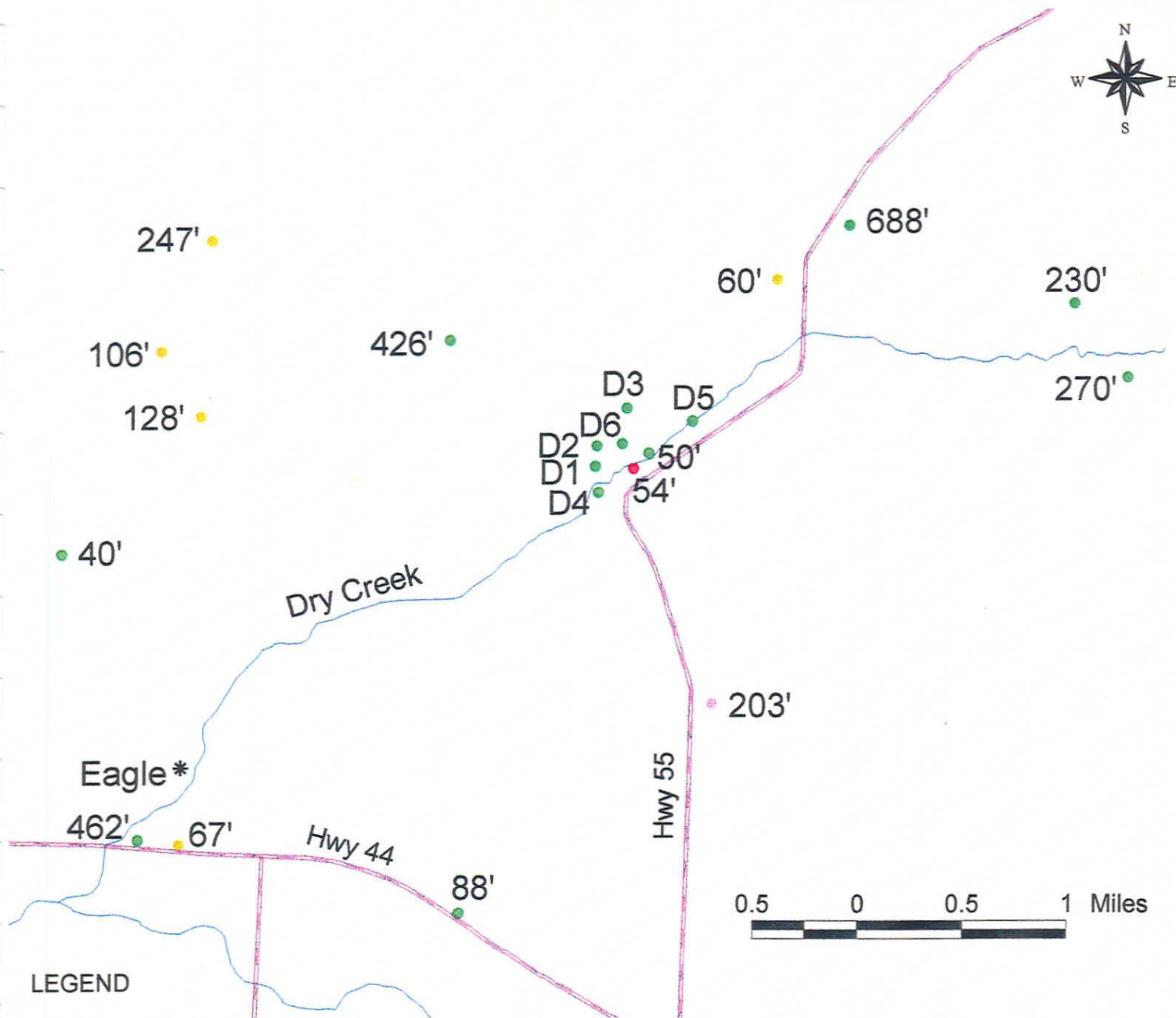
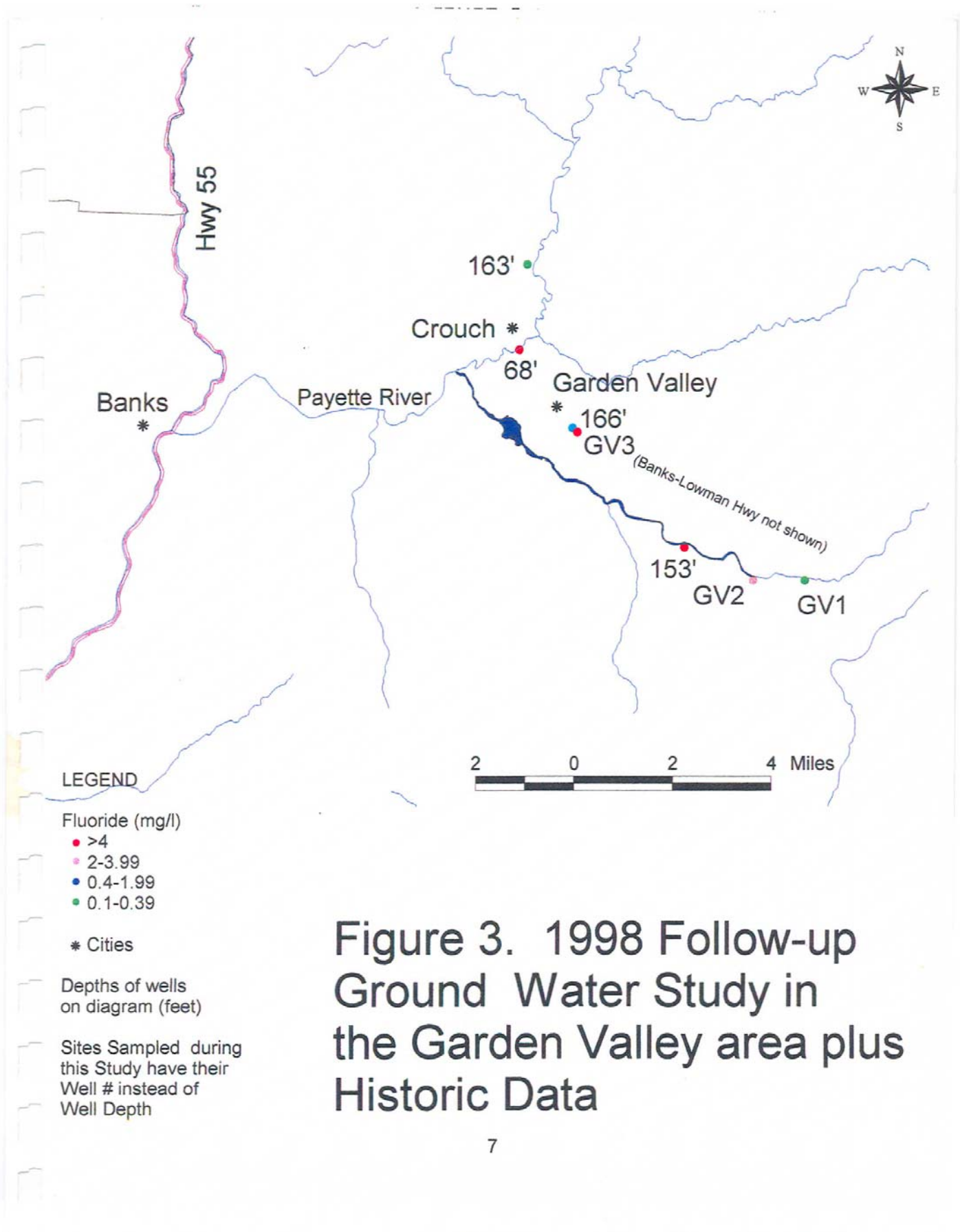


Figure 2. 1998 Follow-up Ground Water Study in the Dry Creek area plus Historic Data



water for many years may result in joint stiffness and pain, followed by serious bone and joint problems known as skeletal fluorosis.

Four well drillers' reports were found and permission letters were sent to the well owners. Only two well owners responded. While out in the area sampling, a neighbor requested to have her well included in the study, which was sampled as well # GV2. A well driller's report for well #GV2 could not be found, the well was reported to be 200 feet.

Of the three wells that were sampled, only one well had fluoride greater than the MCL of 4 mg/l. The fluoride was 5.27 mg/l in well #GV3. All well owners were mailed information explaining fluoride, including what can be done if they have fluoride at levels that should require pre-treatment or an alternate drinking source. Additional information discussed the presence of fluoride as a common naturally occurring constituent found in the ground water in the Idaho Batholith with geothermal influence. Water temperatures show the correlation of the influence of the warmer geothermal waters, the warmer the water the higher the fluoride level (see Table B2).

Horseshoe Bend

The Horseshoe Bend study area is in Boise County along the Payette River and Highway 55 in the foothills just at the edge of the Boise National Forest. This is a sparsely populated rural area of mainly range land is located on the north side of Horseshoe Bend. The Idaho Batholith, or more specifically the Atlanta Batholith, is a visible geologic feature to the north of the area.

The Statewide Monitoring well had elevated fluoride of 13 mg/l. The well is 392 feet deep with a 159-foot casing. It was drilled in 1978. The 20-foot surface seal is composed of the well cuttings.

Four well drillers' reports were found near the Statewide Monitoring well. Three well owners allowed their wells to be sampled. All of the wells had elevated fluoride; well # HB2 and HB3 had fluoride level greater than the MCL which is 4 mg/l. The depths of these wells were 250 to 300 feet. The water temperature ranged from 16.6 to 17.7 °C.

The limited data for this area near Horseshoe Bend shows elevated fluoride in the area ground water (see Figure 4 page 9). All well owners were mailed information explaining fluoride, including what can be done if they have fluoride at levels that should require pre-treatment or an alternate drinking source. Additional information discussed the presence of fluoride as a common naturally occurring constituent found in the ground water in the Idaho Batholith with geothermal influence. Water temperatures show the correlation of the influence of the warmer geothermal waters, the warmer the water the higher the fluoride level (see Table B2).

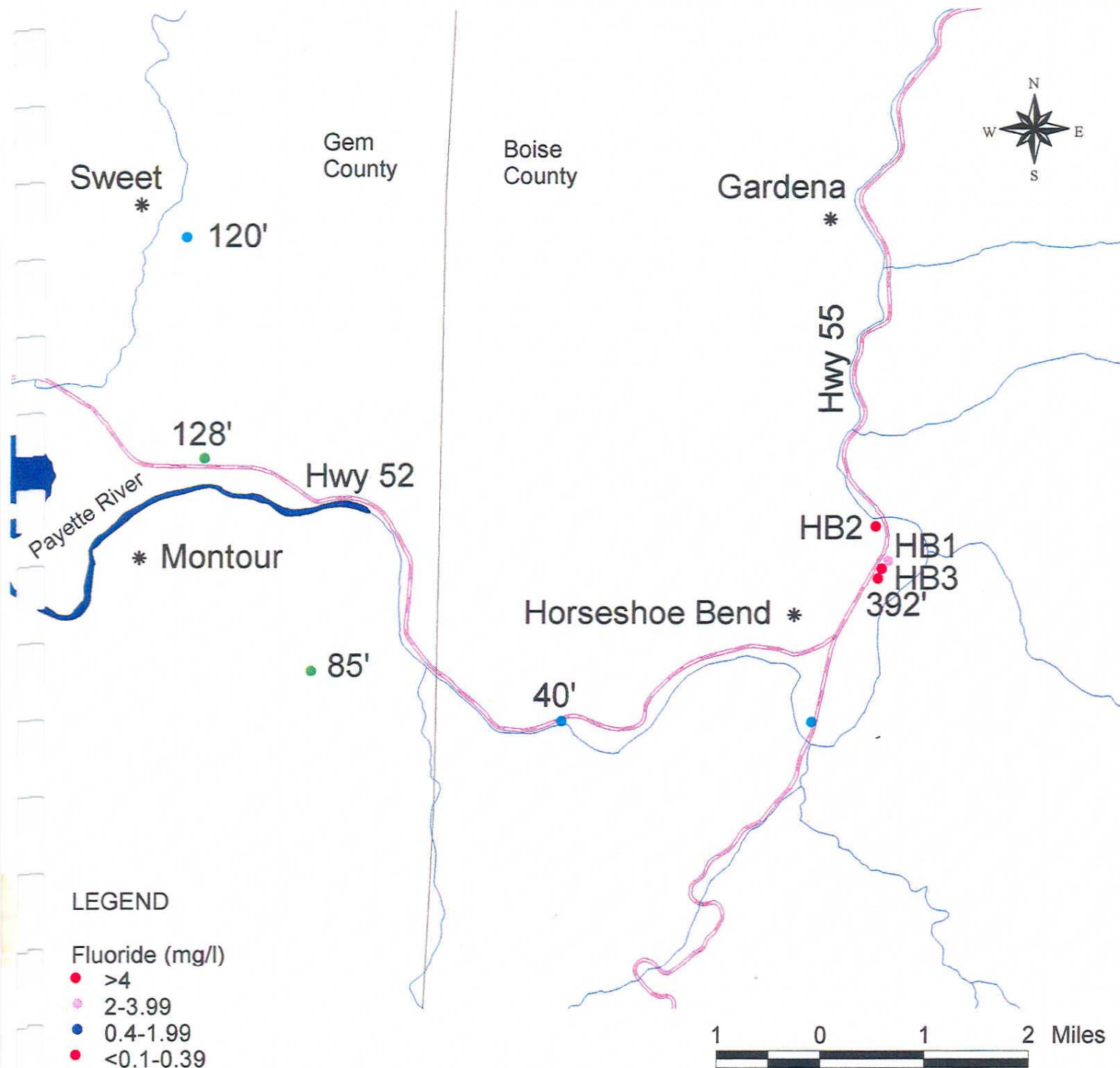


Figure 4. 1998 Follow-up Ground Water Study in the Horseshoe Bend Area plus Historic Data